Scope of Claims

[1] An optical connection structure characterized by a solid viscous connection member having refractive-index matching property being adheringly disposed in a single layer state between the end faces of mutually opposing optical transmission media or between the end face of an optical transmission medium and an optical component that are mutually opposing.

[2] An optical connection structure according to Claim 1, characterized in that the thickness of the viscous connection member disposed between the end faces of mutually opposing optical transmission media or between the end face of an optical transmission medium and an optical component that are mutually opposing is 50 μm or less.

[3] An optical connection structure according to Claim 1 or 2, characterized in that the viscosity retention distance of the viscous connection member is 10 μm or more.

[4] An optical connection structure according to Claim 1, characterized in that the viscous connection member is made of silicone resin or acrylic resin.

[5] An optical connection structure according to Claim 1, characterized in that the viscous connection member is made of sheet-shaped viscous material.

[6] An optical connection structure according to Claim 5, characterized in that the minimum value D of the distance from the center of the end face of the optical transmission medium contacting the sheet-shaped viscous connection member, to the periphery of said viscous connection member, satisfies the following relationship with respect to the radius R of the optical transmission medium:
$R < D \leq 60R$.

[7] An optical connection structure according to Claim 5 or 6, characterized in that the periphery of the sheet-shaped viscous connection member is supported by a supporting

member.

[8] An optical connection structure according to Claim 1, characterized in that, if the minimum distance and maximum distance from the center of the core of the optical transmission medium to the periphery of the viscous connection member are given by D_1 and D_2, respectively, radius of the optical transmission medium by R, and radius of the core of the optical transmission medium by r, the relationships of $D_1 \geq r$ and $D_2 \leq 1.5R$ are satisfied.

[9] An optical connection structure according to Claim 1, characterized in that the optical transmission media are butted against each other using an alignment member.

[10] An optical connection structure according to Claim 1, characterized in that each of the optical transmission media is inserted and thus affixed in an optical-fiber alignment hole provided in a ferrule having at least one optical-fiber alignment hole or a plug containing said ferrule, and a pair of the ferrules or a pair of the plugs are butted against each other in a manner sandwiching the viscous connection member.

[11] An optical connection structure according to Claim 10, characterized by having a member for positioning the ferrules or plugs.

[12] An optical connection structure according to Claim 10, characterized in that the viscous connection member is supported by a supporting member.

[13] An optical connection structure according to Claim 10, characterized in that the ferrule or plug is installed in an adapter and the ferrules or plugs are butted against each other inside the adapter in a manner sandwiching the viscous connection member.

[14] An optical connection structure according to Claim 11, characterized in that the positioning member is a split sleeve and the ferrules or plugs are butted against each other inside said split sleeve in a manner sandwiching the viscous connection member.

[15] An optical connection structure according to Claim 13 or 14, characterized in that the supporting member that supports the viscous connection member is installed in the split sleeve.

[16] An optical connection structure according to Claim 11, characterized in that the positioning member is a guide pin, the ferrule or plug has a guide pin hole, and the ferrules or plugs are positioned by inserting the guide pin into the facing guide pin holes.

[17] An optical connection structure according to Claim 12 or 13, characterized in that the supporting member that supports the viscous connection member is a tubular member and the viscous connection member is supported on one end of said tubular member while the other end of the tubular member is fitted into the ferule or adapter to achieve optical connection.

[18] An optical connection structure according to Claim 1, having at least one pair of optical transmission media, an alignment member with an alignment groove, a solid viscous connection member having refractive-index matching property and able to freely change its shape, and a supporting member that supports the viscous connection member; said optical connection structure characterized in that the end faces of the at least one pair of optical transmission media are opposingly placed inside the alignment groove in the alignment member, the supporting member is placed above the alignment groove between the optical transmission media, and the at least one pair of optical transmission media are optically connected in a manner sandwiching the viscous connection member.

[19] An optical connection structure according to Claim 18, characterized in that the alignment member has a groove in the direction crossing with the alignment groove and the supporting member is placed in said groove.

[20] An optical connection structure according to Claim 19, characterized in that the supporting member has at least one projection, the alignment member has at least one hole, and the projection of the supporting member is inserted and thus affixed into said hole to place the supporting member on the alignment groove.

[21] An optical connection method for connecting the end faces of optical transmission media or the end face of an optical transmission medium and an optical component using the optical transmission media, or optical transmission medium and optical component, and a sheet-shaped viscous connection member having refractive-index matching property; said optical connection method characterized by comprising: a step of placing the sheet-shaped viscous connection member between the end faces of mutually opposing optical transmission media or between the end face of an optical transmission medium and an optical component that are mutually opposing; a step of moving the end face of one optical transmission medium until it adheres to the sheet-shaped viscous connection member; and a step of moving the end face of said optical transmission medium further until the sheet-shaped viscous connection member deforms and adheres to the other optical transmission medium or optical component.

[22] An optical connection method according to Claim 21, characterized in that the viscous connection member is supported by a supporting member.

[23] An optical connection method characterized by comprising: a step of moving a sheet-shaped viscous connection member relative to an optical transmission medium in the axial direction of the optical transmission medium while the end face of said optical transmission medium is pressed and adhered against the sheet-shaped viscous connection member, in order to separate a part of the sheet-shaped viscous connection member while it is still attached to the end face; and a step of joining the optical transmission medium with the viscous connection member attached to its end face with another optical transmission medium or optical component.

[24] An optical connection method that uses at least one pair of optical transmission media, an alignment member with an alignment groove, a solid viscous connection member having refractive-index matching property and able to freely change its shape, and a supporting member that supports the viscous connection member, characterized by comprising: a step of opposingly placing the end faces of the at least one pair of optical transmission media inside the alignment groove in the alignment member; a step of placing the supporting member, which supports the solid viscous connection member that can freely change its shape, above

the alignment groove between the opposing optical transmission media; and a step of butting the opposing optical transmission media against each other in a manner sandwiching the viscous connection member.